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MATERIAL SAFETY DATA SHEET - MSDS# 2150
SECTION 1

QUADRANT ENGINEERING PLASTIC PRODUCTS
THE POLYMER CORPORATION

P.O. Box 14235
Reading, PA. 19612-4235

TELEPHONE NUMBERS:
PRODUCT INFORMATION, (Quadrant EPP) 610-320-6600
TRANSPORTATION EMERGENCY, (CHEMTREC) 800-424-9300

MATERIAL IDENTIFICATION

PRODUCT NAME: SEMITRON ESd 410c

CHEMICAL NAME: POLYETHERSULFONE (PES)

CAS NO.: 25608-63-3 (BASE POLYMER)

PRODUCT USE: ENGINEERING THERMOPLASTIC STOCK SHAPE FOR
SUBSEQUENT FABRICATION.

TSCA INVENTORY STATUS: ALL REPORTABLE INGREDIENTS ARE L
TSCA CHEMICAL SUBSTANCE INVENTORY.

SECTION 2

HAZARDOUS INGREDIENTS

(ADDITIVES NOT HAZARDOUS BY 29 CFR 1910.1200)

IDENTITY	CAS#	CONCENTRATION	TVL (TWA)
NA	NA	NA	NA

SECTION 3

HEALTH HAZARD DATA

ACUTE OR IMMEDIATE EFFECTS: ROUTES OF ENTRY AND SYSTEM
INGESTION: NOT A PROBABLE ROUTE OF EXPOSURE.

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\$ CHANGE REGION

SKIN: SEEK MEDICAL ATTENTION IF RASH OR BURN OCCURS.

EYE: MECHANICAL IRRITATION ONLY.

INHALATION: NOT LIKELY TO BE INHALED DUE TO PHYSICAL FORM

SECTION 4

EMERGENCY FIRST AID

- If exposed to fumes from overheating, move to fresh air. Consult a physician if symptoms persist.
- Wash skin with soap and plenty of water.
- Flush eyes with water. Consult a physician if symptoms persist.
- If molten polymer contacts skin, cool rapidly with cold water. Do not remove polymer from skin. Obtain medical attention to thermal burn.

CHRONIC EFFECTS: NONE KNOWN.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY THIS MATERIAL: NONE KNOWN.

SECTION 5

FIRE AND EXPLOSION HAZARD DATA

FLASH IGNITION TEMPERATURE: 1000 F./538 C., ESTIMATED.

UNUSUAL FIRE, EXPLOSION HAZARDS: NONE KNOWN.

HAZARDOUS COMBUSTION PRODUCTS: HAZARDOUS COMBUSTION MAY INCLUDE INTENSE HEAT, DENSE BLACK SMOKE, CARBON MONOXIDE, CARBON DIOXIDE, NITROGEN OXIDES, HYDROGEN CYANIDE AND HAZARDOUS FRAGMENTS

SPECIAL FIRE FIGHTING INSTRUCTIONS: FIRE FIGHTERS AND OTHER PERSONNEL EXPOSED TO PRODUCTS OF COMBUSTION SHOULD WEAR FULL PROTECTIVE EQUIPMENT INCLUDING SELF-CONTAINED BREATHING APPARATUS. FIRE FIGHTING EQUIPMENT SHOULD BE THOROUGHLY DECONTAMINATED AFTER USE.

EXTINGUISHING MEDIA: WATER SPRAY AND FOAM. WATER IS THE BEST EXTINGUISHING MEDIUM. CARBON DIOXIDE AND DRY CHEMICALS ARE GENERALLY RECOMMENDED BECAUSE OF THEIR LACK OF COOLING CAPABILITY WHICH PERMIT RE-IGNITION.

SECTION 6

ACCIDENTAL RELEASES

SPILL OR RELEASE: CLEAN UP BY VACUUMING OR SWEEPING TO PREVENT RE-RELEASE.

SECTION 7

STORAGE CONDITIONS

Dry storage. Keep containers closed to prevent contamination.

SECTION 8

PROTECTION INFORMATION

EYE: Safety glasses are recommended to prevent particulate matter from while grinding or machining.

SKIN: Protective gloves are required when handling hot polymer. Also, long shirt and long pants if handling molten polymer.

VENTILATION: Local exhaust at processing equipment to keep particulate mg/m³, the OSHA limit for nuisance dusts. Grinding and machining of part reviewed to assure that particulate levels are kept at recommended levels

RESPIRATOR: When dust or powder from secondary operations, such as machining or grinding, are not adequately controlled use respirator approved from dust.

SECTION 9

PHYSICAL/CHEMICAL DATA

APPEARANCE: STOCK SHAPE MAY BE ROD OR PLATE FORM, BLACK

ODOR: SLIGHT ODOR.

MELTING POINT: THIS PRODUCT DOES NOT EXHIBIT A SHARP MELT BUT SOFTENS GRADUALLY OVER A WIDE TEMPERATURE RANGE.

SOLUBILITY IN WATER: INSOLUBLE

VOLATILE CONTENT %: NEGLIGIBLE.

SPECIFIC GRAVITY: 1.35

SECTION 10

HAZARDOUS REACTIVITY

STABILITY AT ROOM TEMPERATURE: STABLE.

MATERIALS TO AVOID: NOT REACTIVE.

CONDITIONS TO AVOID: NONE KNOWN FOR SHAPES.

SECTION 11

TOXICOLOGICAL INFORMATION

CHRONIC TOXICITY: SEMITRON ESd 410 PRODUCTS DO NOT APPEAR TO POSSESS ANY TOXICOLOGICAL PROPERTIES.

MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: NO HUMAN HEALTH EFFECTS AGGRAVATED BY EXPOSURE TO THIS PRODUCT.

CARCINOGENICITY: NONE KNOWN.

SECTION 12

ECOLOGICAL INFORMATION

AQUATIC TOXICITY: Toxicity is expected to be low based on insolubility o water.

SECTION 13

SPILL OR RELEASE: Clean up by vacuuming or wet sweeping to minimiz

WASTE DISPOSAL: Landfill or incineration in compliance with federal, sta regulations.

SECTION 14

TRANSPORT INFORMATION

DOT HAZARD CLASS: NA

SHIPPING NAME: NA

SECTION 15

REGULATORY INFORMATION SECTION 313 SUPPLIER NOTIFICATIO (III-TOXIC CHEMICALS LIST)

This product contains no known toxic chemicals subject to the reporting re section 313 of the Emergency Planning and Community Right-To-Know A 40 CFR 372.

STATE RIGHT TO KNOW LAWS

No substances on the state hazardous list, for the states indicated below, a manufacture of products on this Material Safety Data Sheet, with the excep While we do not specifically analyze these products, or the raw materials u manufacture, for substances on various state hazardous substances lists, knowledge the products on this Material Safety Data Sheet contain no suc except for those specifically listed below:

PENNSYLVANIA:

**SUBSTANCES ON THE PENNSYLVANIA HAZARDOUS SUBSTANCES
AT A CONCENTRATION OF 1% OR MORE:** NONE KNOWN.

**SUBSTANCES ON THE PENNSYLVANIA SPECIAL HAZARDOUS SUBS
PRESENT AT A CONCENTRATION OF 0.01% OR MORE:** NONE KNOW

**CALIFORNIA PROPOSITION 65: SUBSTANCES KNOWN TO THE STAT
CALIFORNIA TO CAUSE CANCER:** NONE KNOWN.

**SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE B
OR OTHER REPRODUCTIVE HARM:** NONE KNOWN.

>HMIS RATING

Health	0
Flammability	1
Reactivity	0
PPE	A
#Acute *Chronic	

SECTION 16

MISCELLANEOUS INFORMATION

Prepared by: T.W. Swavely, Product Compliance Coordinator.

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Reviewed: April 28, 1999

Supersedes: New Issue

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NA = Not applicable

NE = Not established.

> = New or revised information in this section when ">" appears in the left margin.

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Polyethersulfone

Additives: reinforced

Material Properties

Mechanical Properties		Conditions	
		State 1	State 2
Elastic Modulus (MPa)	2657	tensile	
Flexural Modulus (MPa)	2898	23 °C	
Tensile Strength (MPa)	83	at break	
Flexural Strength (MPa) at yield or break	111		
Izod Impact (J/cm of notch) 1/8" thick specimen unless noted	0.8		

Thermal Properties		Condition	
		Pressure	State
Coef of Thermal Expansion ($10^{-6}/^{\circ}\text{C}$)	49		
Deflection Temperature ($^{\circ}\text{C}$)	204	1.82 MPa	

Physical & Electrical Properties		Condition	
		State	
Specific Gravity	1.37		
Water Absorption (% weight increase)	1.85	after 24 hrs	
Dielectric Strength (V/mil); 1/8" thick specimen unless noted	380		

Processing Properties		Condition	
		Type	
Melt Flow (gm/10 min)	12.5 - 30		
Linear Mold Shrinkage (cm/cm)	0.007		

Suppliers

Amoco Polymers

Alpharetta, GA 800-621-4557

Amoco Polymers

Alpharetta, GA 800-621-4557

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Uses: Gasoline and oil-loading hose; sealants and adhesive compositions; binder in solid rocket propellants; gaskets; paint spray hose.
See also "Thiokol."

polysulfone. A synthetic thermoplastic polymer.
Properties: Hard, rigid transparent solid; tensile strength 10,000 psi; sp. gr. 1.24; flexural strength 15,000 psi; good electrical resistance; minimum creep; low expansion coefficient. Soluble in aromatic hydrocarbons, ketones and chlorinated hydrocarbons; resistant to corrosive acids and alkalis, to heat and oxidation, and to detergents, oils, and alcohols. Dimensionally stable over temperature range -100 to +148°C. Tends to absorb moisture. Readily processed and fabricated. Combustible but self-extinguishing.

Derivation: Condensation of bis-phenol A and dichlorophenyl sulfone.

Uses: Power-tool housings; electrical equipment; extruded pipe and sheet; auto components; electronic parts; appliances; computer components; base matrix for stereotype printing plates.

polyterpene resin. A class of thermoplastic resins or viscous liquids of amber color, obtained by polymerization of turpentine in the presence of catalysts such as aluminum chloride or mineral acids. The resins consist essentially of polymers of alpha- or beta-pinene and are soluble in most organic solvents.

Uses: Paints; rubber plasticizers; curing concrete; impregnating paper; adhesives; hot-melt coatings; pressure-sensitive tapes.
See also pinene.

polytetrafluoroethylene (PTFE: TFE) (C₂F₄)_n. A polymer of tetrafluoroethylene. It is essentially a straight chain of the repeating unit [-CF₂-CF₂-]_n. Soft and waxy, with a milk-white color. It can be molded by powder metallurgy techniques involving mixing with a diluent that is subsequently removed and sintering at 371°C.

Properties: Highly resistant to oxidation and action of chemicals, including strong acids, alkalis, oxidizing agents; resistant to nuclear radiation and ultraviolet rays, ozone, and weather. Halogenated solvents at high temperatures and pressures have some adverse effect. Retains useful properties up to 287°C and is strong and tough. Low coefficient of friction (0.05), and antistick properties; excellent resistance to electricity. Coefficient of thermal expansion greater than other plastics and metals. Nonflammable.

Forms: Extrusion and molding powders, aqueous dispersion, film, multifilament fiber.

Hazard: Evolves toxic fumes on heating.

Uses: Gaskets, liners, seals, flexible hose; ablative coatings for rockets and space vehicles; chemical process equipment; coatings in aerospace; coaxial spacers, insulators, wire coating and tape in electrical and electronic fields; bearings, seals, piston

rings; antistick coatings for cooking vessels; felts, packings and bearings.

See also "Teflon"; "Halon."

polytetramethylene ether glycol. See "Polymeg."

polythene. Generic name for polyethylene (q.v.); no longer current in the United States, but is still used in England.

polythiadiazole [-C₆H₄-C₂N₂S-]_n. A polymer made from polyoxathiahydrazide. Can be converted to fibers. Stated to retain properties to 398°C, and to have resistance to thermal degradation such that it retains 60 or 70% of original tenacity after 32 hours at 398°C.

polythiazyl (SN)_n. An experimental polymer of sulfur nitride with covalent linkages, said to have the optical and electrical properties characteristic of metals. Thin films are reported to exhibit epitaxial growth.

polytrifluorochloroethylene resin. See chlorotrifluoroethylene resin.

polyunsaturated fat. A fat or oil based at least partly on fatty acids having two or more double bonds per molecule, such as linoleic and linolenic acids. Examples are corn oil and safflower oil.

Uses: Margarine and dietary foods; salad dressings, etc.

polyurethane. A thermoplastic polymer (which can be made thermosetting) produced by the condensation reaction of a polyisocyanate and a hydroxyl-containing material e.g., a polyol derived from propylene oxide or trichlorobutylene oxide. The basic polymer unit is formed as follows: R₁NCO + R₂OH → R₁NHCOOR₂.

Fiber:

Properties: High elastic modulus, good electrical resistance; high moisture-proofness; crystalline structure. Combustible.

Derivation: Reaction of hexamethylene diisocyanate and 1,4-butanediol.

Uses: Chiefly in so-called spandex fibers (q.v.) for girdles and other textile structures requiring exceptional elasticity; bristles for brushes, etc.

Coatings:

Properties: Excellent hardness, gloss, flexibility, abrasion resistance, and adhesion; resistant to impact, weathering, acids and alkalis; attacked by aromatic and chlorinated solvents. Applied by brush, spray, or dipping. Combustible.

Derivation: Formed from "prepolymers" (q.v.) containing isocyanate groups (toluene and 4,4'-diphenyl methane diisocyanates) and hydroxyl-containing materials such as polyols and drying oils.

Uses: Baked coatings; two-component formulations; wire coatings; tank linings; maintenance paints; masonry coating.

Elastomers: